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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

REPORT

CD NO. 25X1

COUNTRY	USSR (Black Sea)	**DATE DISTR**	**30 September 1955**
SUBJECT	Atomic Energy Research Institute at Agudzeri	**NO. OF PAGES**	9
PLACE ACQUIRED		**NO. OF ENCLS.** (LISTED BELOW)	25X1
DATE OF INFO.		**SUPPLEMENT TO REPORT NO.**	

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Comment: Throughout report, read Agudzheri as Agudzeri, Sukhum as Sukhumi, Kvartsava as Sergey Mikhaylovich Kvartsava. 25X1

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COUNTRY USSR

REPORT

TOPIC Electric Department of the Nuclear Institute of Professor Hertz in Agudzheri

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EVALUATION

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DATE OF CONTENT

DATE OBTAINED

DATE PREPARED 5 November 1954

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REFERENCES

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PAGES 3 ENCLOSURES (NO. & TYPE)

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1. The electric department of the Professor Hertz Nuclear Institute in Agudzheri was installed in a new single-story building, about 12 x 45 meters. The southern portion of the building housed the battery station, the middle section the generators and the northern part a calender roll for mesh diaphragm and some improvised galvanizing equipment for nickel plating. The generator room was subdivided into two sections, one for d.c. and one for a.c. or 3-phase a.c. respectively. Each section was equipped with a switching panel through which current received from the emergency power station was directed.

25X1

2. The electrical workshop transformed the power received from the transformer station and from the emergency power station into various kinds of currents and also charged storage batteries. The laboratories generally requested the specific power needed for the various purposes of their activities.

3. Normal operating current was received from "Sukhum GEST" Power Plant which had been built between 1945 and 1947. The power was transmitted as far as Sinop through two underground cables along the highway and from there to Agudzheri by a overhead line on wooden posts. The underground cables were laid in 1947 and in 1949 respectively and only one was serviceable while the other one was continuously being repaired. The 10,000 V current received was transformed to 220/360 V by two transformers in the transformer station and then transmitted for further distribution to the electric department by means of an underground cable consisting of eight 3-wire lines of 175 square mm cross-section each. In the electric workshop, the power was further transformed to serve the purposes of the individual workshops and laboratories. The transformer station also housed four US Diesel emergency generators, each of 350 A/380 V.

4. The battery station was equipped with three double series of monocellular storage batteries for continuous operation to make possible day and night operation or charging. For special requirements, two of the three double batteries could be coupled in order to obtain a doubled power output. The three series included:

a. Glass-lead cells, each about 60 x 60 x 80 cm
including two series, each of 60 containers - 110 V/800 A/h
to be switched to 220 V and 1,600 A/h maximum

b. Bakelite - lead cells, each about 30 x 30 x 40 cm
including two series of 60 cells each - 110 V/60 A/h

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c. Bakelite - lead cells, each about 30 x 30 x 40 cm including two series of 60 cells each - 24 / 60 A/h can be broken down by a cell switch to 2-4-6-12 V.

5. The d.c. Section was equipped with 20 V generators from the Berlin Kaiser Wilhelm Institute, including some 1910-Siemens models. Only six generators, however, were in operation:

2 charging generators for the storage batteries, each 175 A/110 V to be converted to 220 V.
1 12 V/ 30 A generator
1 30 V/ 5 to 6 A generator
1 60 V/ 15 A generator
1 220 V/120 A generator

The generators not in operation were provided for 20, 60, and 110 V and from 3 to 5 A.

6. In the Summer of 1950, two large twin generators, one 475-hp engine driving two 4 - 24 V/1,000 A generators, were put into operation as power source for the new hydrogen and oxygen installation. Prior to August 1950, oxygen had been produced by a mobile US installation which was then converted to a stationary oxygen plant. Hydrogen was then made at the electric department.

7. The a.c. section was equipped with 2 x 110 V/150 A generators and about 15 cycle converters capable of 5000 cycles. The converters were not in operation and some were not even serviceable. The switching panel was operated with two collecting bars. An additional distribution panel was located in the main building of the institute.

8. Prior to 1950 when the new hydrogen installation was put into operation, hydrogen was produced with improvised equipment under a lean-to shed attached to the northern end of the elctrical workshop. For this purpose, Anton Blitz head-mounted a standard steel container on an automatic tilting device. The bottle neck was provided with a valve shutter which could be connected to racking pipes leading to the filling bottles. The steel container was charged with 1.2 kg ferrosilicon and 2 to 3 kg sodium hydroxide which was all mixed with about 8 liters of water and then sealed and tilted. At a pressure of 80 to 90 atmospheres, the gas was filled into a preevacuated container until the pressure of both containers was about 40 atmospheres. Subsequently a second bottle was filled to a pressure of about 20 atmospheres. Dr Reichmann generally received three hydrogen containers with an average pressure of 30 atmospheres. The hydrogen was needed by the chemical section for the tubular diaphragm.

9. Dr Reichmann, an expert in ceramics, produced the tube diaphragm with a paste which he passed through a plodder. The tubes had a diameter of about 20 mm, were 40 to 50 cm long and 0.1 to 0.2 mm thick. The plodder dropped the tubes into a hardening bath filled with an agent similar to alcohol. The tubes were then put on rods and burned in a kiln for which the hydrogen was needed. The completed tubes were cut to precise length by two counter-rotating cutters. Laboratory technician Helmut Fischer and Ingenieur Richard Bock worked on the production of diaphragm tubes. In 1948 or 1949, the Soviets put in an urgent request for the production of two series of 800 such tubes for some other place.

10. A northern room of the electrical department housed a manually operated motor roller. Prior to 1948, thin copper and nickel foils about 20 x 20 or 25 x 25 cm, square, were rolled there in individual processes. The

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experiments conducted with this roller under the supervision of Kvartsava (fnu), the deputy of Professor Hertz, appeared to have been of little success. In 1948, the activities were revived and Kvartsava personally rolled meshes of the aforementioned size which he had allegedly handbraided. It was said that these meshes could not be produced by ordinary Jacquard looms and complicated special machines were required. The meshes needed for the laboratory tests were therefore, handbraided. Kvartsava continued his experiments until 1949. No further information was obtained.

11. In connection with the diffusion boxes of Muehlenpfordt, a first and a second experiment were mentioned and it was said that the result of the first experiment in early 1949 was "2 percent". The "four percent" obtained in the second were considered good. The subtance obtained in the diffusion process was rushed to Moscow.

12. In late 1948 or early 1949, Dr Zuelke (fnu) who worked together with Professor Hertz in the main building of the institute requested the electrical department to supply him with electric current to be converted from 50 to 100 cycles which was needed to drive a 0.5-hp engine of a turbine at 3,000 or 6,000 rpm respectively. The problem was difficult to solve and Anton Blitz tried to accomplish the task by means of a complicated switching system of two counterrotating engines. When Blitz visited the main building, he saw an instrument the upper part of which was a closed cylinder, about 30 cm in diameter and 70 to 80 cm high, mounted on another cylinder, 50 to 60 cm in diameter and about 25 cm high. This unit which Dr Zuelke called a turbine, was interconnected to other instruments by copper pipes. When the unit was put into operation briefly, a penetrating high whistling noise was heard which could probably not have been produced by the small engine or a turbine rating at 6,000 rpm. It was therefore assumed that turbine and engine were connected a high-speed transmission.

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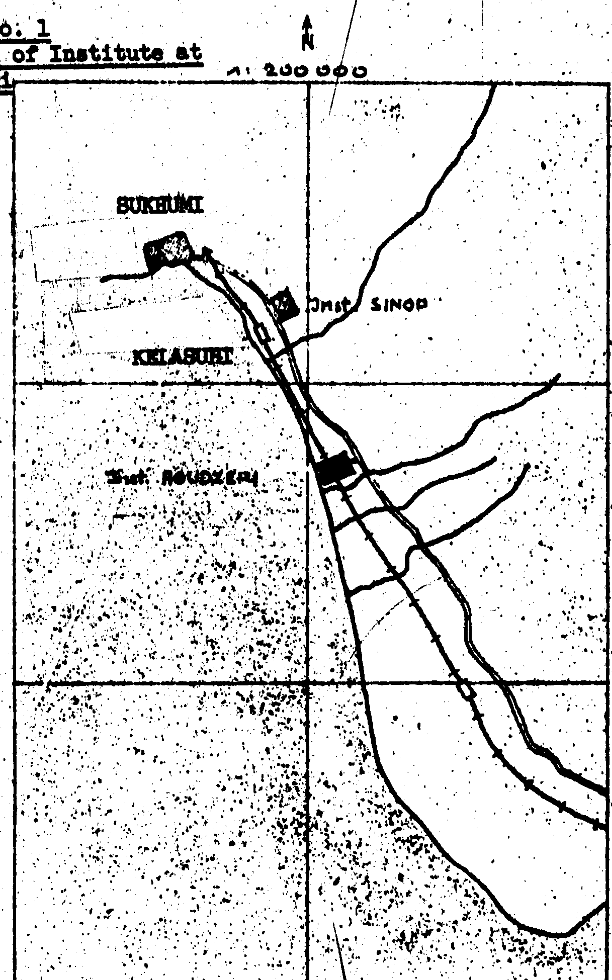
Sketch No. 1
Location of Institute at Agudzheri



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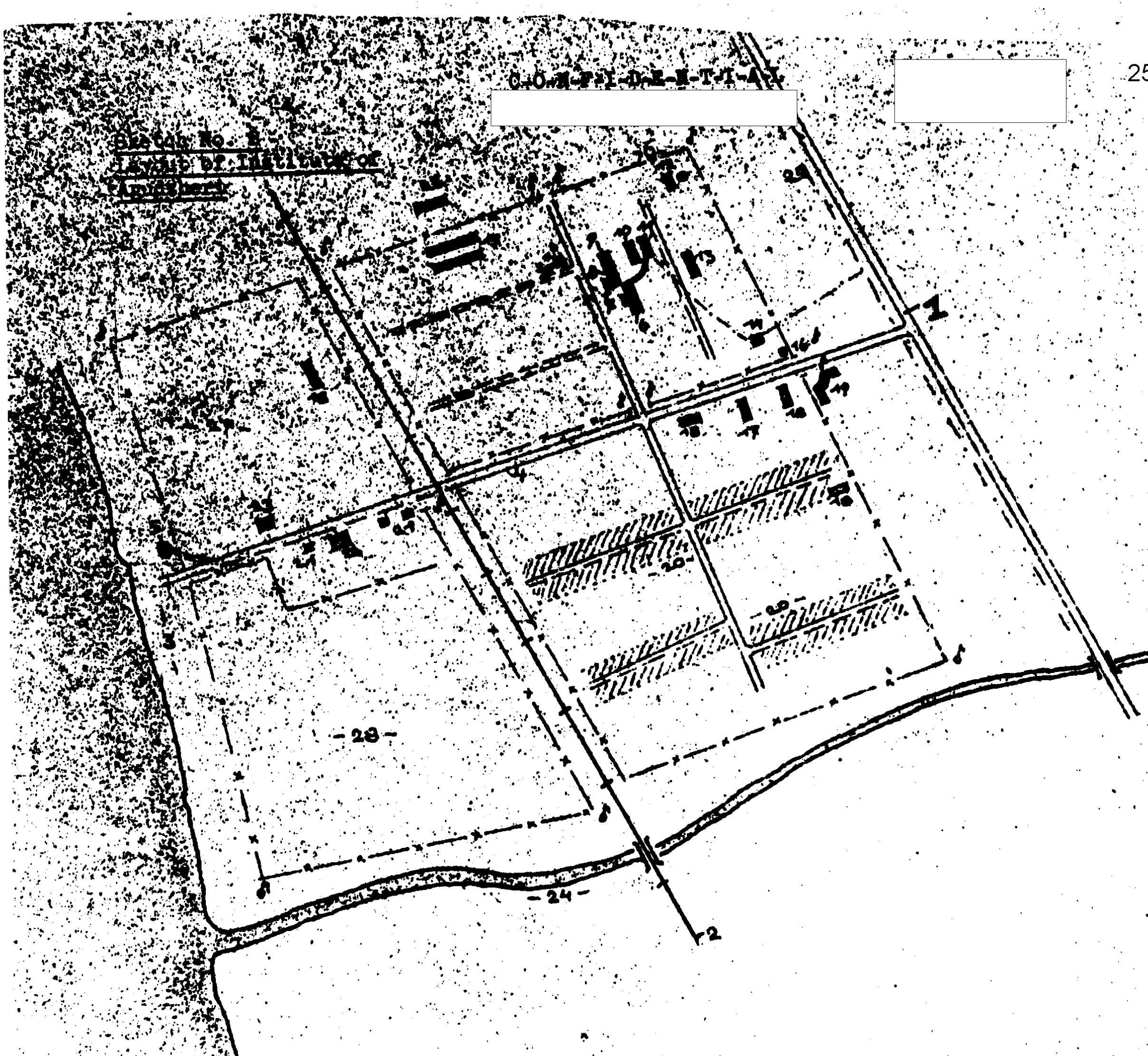

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Layout of the Professor Hertz Institute in Agudzheri, Scale 1 to 10,000

Legend:

1. Highway to Sukhumi
2. Single-track railroad line to Sukhumi
3. Beach on the Black Sea
4. New asphalt road extending as far as the railroad line
5. Old light house
6. Main instutute building
7. Muehlenpfordt's laboratory
8. New building housing the electrical construction shop
9. New glass blowing plant
10. New mechanical workshop
11. New electrical department
12. New gas works operating on oil
13. Chemical section, new building
14. Transformer station and emergency power plant, new building
15. Wooden storage sheds
16. Guard house, new building
17. Kitchen and mess hall, new building
18. Former quarters of the sanatorium
19. New Soviet administration building
20. Institute settlement
21. Old log houses of the former sanatorium
22. Villa of Professor Hertz
23. Guest house
24. River
25. Three-phase power transmission line on wooden posts
26. Guard quarters
27. Subtropical park
28. Orchard
29. Hydrogen and oxygen plant with containers, constructed in 1950

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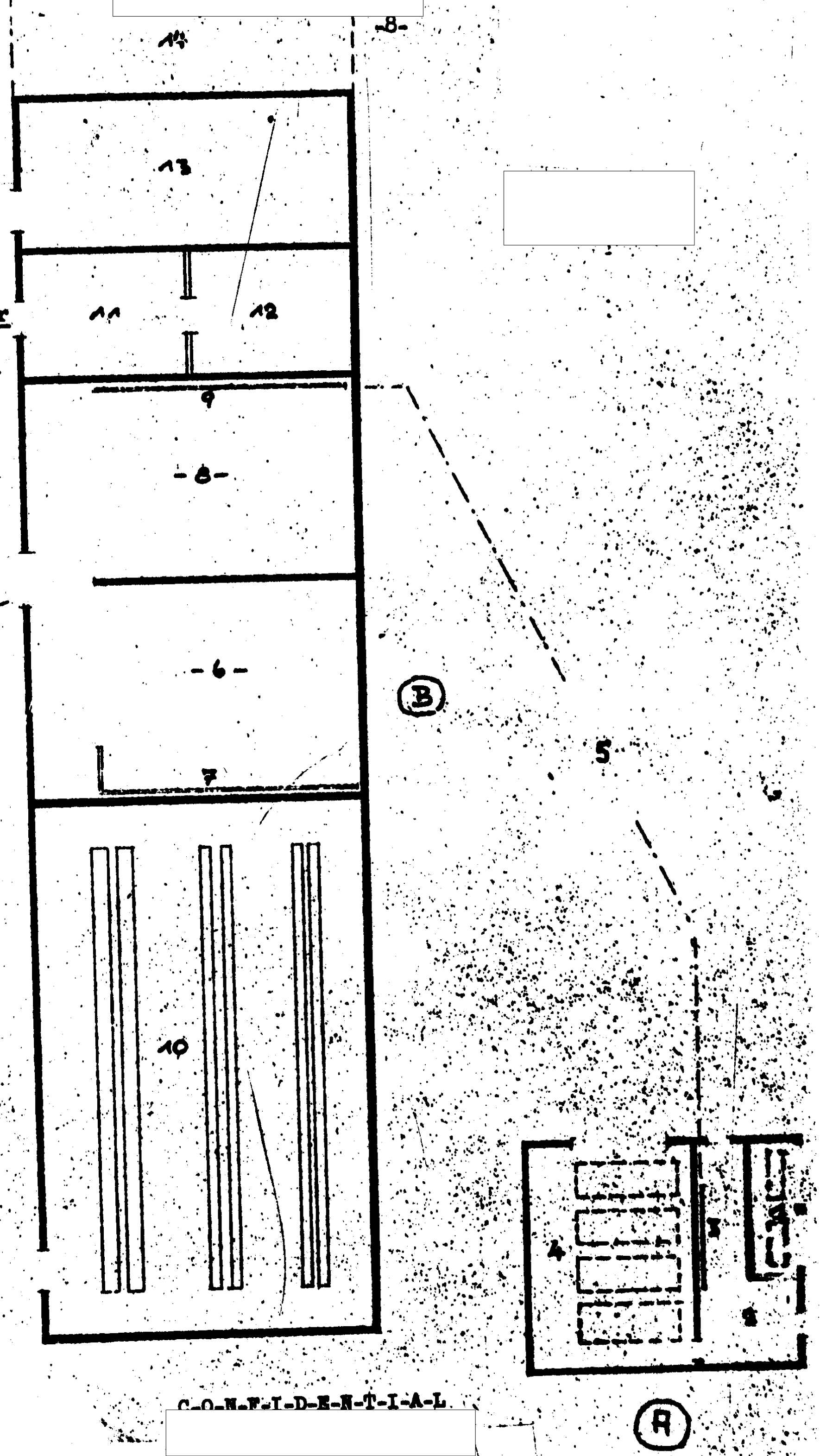
Sketch No. 3
A. Layout of Transformer Station
B. Layout of Electrical Department



Layout of Transformer and Emergency Power Station and of the Electrical Department
Scale 1 to 200

Legend:

A. Transformer Station

1. Two transformers
2. Workshop
3. Switching panel
4. Four emergency power generators

B. Electrical Department

5. Underground cable
6. D.C. generators
7. D.C. switching panel
8. A.C. generator and cycle transformer
9. A.C. switching panel
10. Battery section
11. Spare part depot for batteries
12. Acid depot
13. Boiler for diaphragm and galvanizing equipment
14. Lean-to roof with improvised equipment for the production of hydrogen